**Nanobiotechnology for health-care**

**The effect of biopolymer matrix on the drug release from hydroxyapatite based hybrid scaffolds**

**Arita Dubņika1, Liudmyla Sukhodub2,** **Mariia Kumeda2, Leonid Sukhodub2**

*1Riga Technical University, Institute of General Chemical Engineering, Rudolfs Cimdins Riga Biomaterials Innovation and Development Centre*

*2Sumy State University, Rimsky-Korsakov,2, Sumy-40007, Ukraine.*

*E-mail: l.sukhodub@gmail.com*

The development of novel nanostructured hybrid materials based on synthetic calcium deficient hydroxyapatite in combination with natural biodegradable polysaccharides (chitosan, sodium alginate) for further use as scaffolds for dose-controlled drug delivery into the area of bone defect is in a focus of modern biomedicine researches. In Europe and the United States, surgical site infections represents second-most common hospital-acquired infections and are greatly responsible for patients prolonged stay in hospital and lethality**[[1]](#footnote-1)**[[2]](#footnote-2)[[3]](#footnote-3). Bone infections are the main obstacles for bone healing, thus it is crucial to ensure local delivery of antibiotics such as vancomycin hydrochloride (V-HCl). V-HCl is an antibiotic frequently used in bone tissue surgeries for the treatment of infections caused by gram positive organisms e.g. *staphylococcus*, *streptococcus*, and those unresponsive to other antibiotics[[4]](#footnote-4).

The work is devoted to the study of the influence of microwave irradiation on the formation of cdHAp in the presence of natural polysaccharides (sodium alginate, chitosan) and the development of new technology for creating polymer-apatite composite scaffolds with specified physical properties - porosity, crystallinity, resorption. The dependence of the drug release dynamics on the structure of the obtained polymer-apatite scaffolds studied in order to get a more effective drug delivery system in the implantation zone.

.

 <http://www.thelancet.com/global-burden-of-disease> Global Burden of Disease Study 2010

2 http://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions. Epub: 2018 Feb 15

3 S. Blatt et.al. Infection. 2019 Aug;47(4):519-555.

4 Li et.al., J. Eur. Ceram. Soc., 2014, 34/2: 505-514

1. <http://www.thelancet.com/global-burden-of-disease> Global Burden of Disease Study 2010 [↑](#footnote-ref-1)
2. http://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions. Epub: 2018 Feb 15 [↑](#footnote-ref-2)
3. S. Blatt et.al. Infection. 2019 Aug;47(4):519-555. [↑](#footnote-ref-3)
4. Li et.al., J. Eur. Ceram. Soc., 2014, 34/2: 505-514 [↑](#footnote-ref-4)